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RF/RMRS-99-300

Asbestos Sampling and Analysis Plan

for

Property Utilization And Disposal Yard Boiler Site

ROCKY MOUNTAIN REMEDIATION SERVICES, L L C

REVISION 0

JANUARY 1999

ASBESTOS SAMPLING AND ANALYSIS PLAN

FOR PROPERTY UTILIZATION AND DISPOSAL YARD BOILER SITE

REVISION 0

January 1999

This Sampling and Analysis Plan has been reviewed and approved by

Nick Demos, Project Manager — Date: 1-26-99

David Farler, Health & Safety — Date: 1-26-99

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This Sampling and Analysis Plan was prepared by

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APPENDICES

ACRONYMS

AHA	Activity Hazards Analysis
AIHA	American Industrial Hygiene Association
ASD	Analytical Services Division
CCR	Colorado Code of Regulations
CFR	Code of Federal Regulations
DQO	Data Quality Objectives
Ft^2	Square Feet
HUD	Housing and Urban Development
NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PLM	Polarized light microscopy
PPE	Personal Protective Equipment
RCT	Radiation Control Technician
RFETS	Rocky Flats Environmental Technology Site
TRM	Transuranic Mixed
TRU	Transuranic

ASBESTOS SAMPLING AND ANALYSIS PLAN

PROPERTY UTILIZATION AND DISPOSAL YARD BOILER SITE

1 0 INTRODUCTION

1 0 1 PURPOSE

The purpose of this Sampling and Analysis Plan (SAP) is to provide guidance to determine the presence or absence of asbestos fiber levels in the top 1 inch of soil within a 2800 square foot area in the Property Utilization and Disposal (PU&D) Yard at the Rocky Flats Environmental Technology Site (RFETS) An abandoned boiler was previously stored at this location (APPENDIX A, FIG 1 0) The boiler was reported as potentially releasing asbestos to the environment in November 1992 and subsequently reported as a Potential Area of Concern (PAC # NW-1501) The boiler has since been disposed, and minimal remediation of the soil was accomplished, but no soil samples were acquired to document the process This characterization effort is to be implemented, completed and evaluated as a No Further Action (NFA) candidate within the FY99 budget cycle

1 0 2 SCOPE

The scope of this plan includes the sampling of approximately 2800 square feet (70' X 40", with the long sides of the rectangle on the east and west borders) of surface soils to a depth of 1 inch where an abandoned boiler was stored Documentation indicates that the boiler was insulated with asbestos containing block and mud at percentages of approximately 60% (see Appendix B) Remediation may be required if the sampling results indicate asbestos fiber levels above 1% in the top one inch of soil within the proposed affected area Further sampling and additional grids may be required if asbestos fiber levels above 1% are discovered in perimeter grid areas

Field sampling activities are scheduled for the last week of January 1999, analysis during the first week of February 1999 and a final report documenting analytical results and including photographs delivered March 1, 1999 The site will undergo an evaluation as either requiring further action or proposed for no further action (NFA) by March 1999 consistent with the Rocky Flats Cleanup Agreement guidance A preliminary walkdown was performed with a Colorado State certified asbestos building inspector on October 6, 1998 This SAP was prepared and is consistent with all available data for PAC NW 1501 including information gathered from the October 1998 walkdown

1 0 3 PROTOCOL

Contained herein is a preliminary sampling and analysis protocol for the collection of asbestos samples in the top 1" of soils for the PU &D Yard Boiler Site (PAC NW 1501) This approach will ensure that the process will be in compliance with applicable Federal and State regulations Sampling and analysis methodologies prescribed within this SAP are specifically designed to provide occupational hazard assessment information specific to asbestos contamination in the affected area soil These methodologies will support the necessary requirements to recommend further action or no further action

2 0 METHODOLOGY

In order to facilitate the soils sampling effort, the original suspected soil contaminating material must

be characterized Historical records and process knowledge are used extensively in this process PAC NW-1501 (see Appendix B) identifies the potential contaminant in the affected area as chrysotile asbestos at 60% in the abandoned boiler insulation These data will be included in the report if the inspector feels these data are relevant and meets the minimum requirements of this plan and any related regulatory drivers

During the October 1998 tour, no visible suspect asbestos containing insulating materials were discovered or identified in the affectedarea where the boiler was stored

2 0 1 INSPECTION RATIONALE

Inspecting soils for asbestos is necessary at this location to justify what future actions or no further actions may be warranted Since asbestos is a solid substance that does not migrate into soils, inspection and subsequent sampling of the top1 inch of soil will characterize the extent of contamination, if any

2 0 1 1 Inspecting For Asbestos

Historical records and process knowledge are utilized in the inspection process Aerial photographs place the location of the boiler while stored at the PU&D yard. Using the photograph and interviews with site employees, an affected area is conservatively selected This area is visually inspected for the presence of suspect asbestos containing insulation The physical presence of suspect asbestos containing insulation can be verified through subsequent sampling and analysis of the material Actual soil contamination will be verified through random sampling at nine predetermined locations If asbestos is determined to be present at greater than 1% in any grid area, additional step-out grids will be added to the characterization study See Appendix A grid map for details

3 0 SURVEY PROCEDURES

3 0 1 SAMPLE QUANTITY

Determination of sample quantity is based on the regulatory drivers attendant with each sample type In the absence of a regulatory driver, process knowledge, historical data and the inspector's experience are the relevant deciding factors

3 0 1 1 Sampling For Asbestos In Building Materials

As no regulatory protocol exists for sampling for asbestos in soil outside buildings, a functional and applipicable protocol was derived from EPA 40 CFR 763 86, which is the Asbestos in Schools regulation

The number of asbestos samples for each homogeneous area is outlined in EPA 40 CFR 763 86 Sample quantity is decided first by a material's physical condition of friability, then by its general category Friable materials are those that are capable of being crumbled or reduced to powder by hand pressure Only friable surfacing materials, such as fire-proofing or ceiling texture, will have a nine section grid applied to a blueprint of the area and samples will be acquired from the center of randomly selected grids If the homogeneous area of friable surfacing material is less than 1,000 ft^2 (square feet), three samples are needed; if between 1,000 and 5,000 ft^2, five samples are needed, if the area is over 5,000 ft^2, seven samples are needed

Applying this regulatory driver to the needs of this project would necessitate a minimum of five random samples. In order to adequately represent the affected area, which is soils and not a manufactured or mixed material, additional samples will be acquired

3 0 1 2 Sampling For Asbestos in Soils

In the case of sampling for asbestos in soils, Colorado Regulation 8 requires that the top 1 inch of soils in crawlspaces of buildings be sampled and analyzed for asbestos Should asbestos be discovered in amounts greater than 1% all gross visible contamination is removed then the top 2 inches of soil is removed or the area is sealed with concrete or other impermeable material In order to facilitate the need for random samples, the EPA guidance document Asbestos in *Buildings Simplified Sampling Scheme for Friable Surfacing Materials* (Office of Toxic Substances October 1985) will be utilized

This procedure requires that the affected area within PAC NW 1501 be laid out in a nine section grid, with each grid area approximately 311 square feet The grid sections are numbered 1 9 Each grid section will be sub-sectioned into nine equally sized areas (approximately 35 square feet) Three randomly selected sub-areas will be identified, samples will be acquired from each and composited into the same sample container In this specific case, the affected area is approximately 2800 square feet necessitating a minimum of five samples In all cases the EPA recommends nine samples Based on this recommendation and the size and type of affected area, nine (9) composited samples will be acquired with one additional QA sample Refer to the detailed map in Appendix A Subset grid spacing is based upon Gilbert 1987 and assumes a 95% confidence level that contamination, if present, will be detected The "hot spot" method will be utilized with an estimated 5' circular diameter The rectangular grids will be established and a sample will be collected in the center of the randomly selected grid

3 0 2 SAMPLE LOCATION

Sample locations are selected according to a grid map, with each location at the center of a randomly selected sub-grid rectangle In the case of sampling in soils, the sample grid map (see Appendix A) determines locations Exact locations will also be directly affected by radiological concerns, if any In the absence of radiological surveys, or release of the area by Radiological Engineering, a radiological control technician (RCT) will accompany the inspector If a selected location is determined to exceed acceptable parameters, a second location will be selected Should no radiologically acceptable location be found a contaminated sample will be acquired and treated as a radiologically contaminated sample and cleared through Radiological Operations and Engineering

4 0 SAMPLING

Each sample will be acquired with the intent of assuring the quality representation and safety of the process The following steps will be performed for each sample acquired Note that a RCT may be present as necessary to survey the area and location of the sample prior to proceeding

4 0 1 SAMPLE NUMBERING

Each composited sample will recieve an individual number made up of the date, followed by a dash, followed by the sampler's initials, followed by a dash, followed by the randomly selected sub-grid numbers, followed by a dash, followed by the major grid number (Example 990127 MS-123-1)

4 0 2 ASBESTOS IN SOILS

Sampling for asbestos is performed using destructive techniques that require acquiring a representative sample of the material down to the required depth Each sample must contain a minimum of one cubic centimeter of material to facilitate analysis and archival processes

All sampling will be in accordance with the Activity Hazards Analysis (AHA) The AHA, reviewed

and approved by Industrial Hygiene, outlines potential hazards involved for sampling activities prescribes PPE and outlines safety precautions to be utilized during the specified sampling activity

Bulk sampling procedures as outlined

- The location of the sample is visually verified against written descriptions
- A polyethylene drop cloth is placed next to the sample location All tools and containers used in the process are placed on the drop cloth
- The immediate sample area is dampened with a mist of water and surfactant
- A small metal scoop, approximately 2" in diameter, is used to penetrate the affected soil to a depth of 1" The sample is acquired, making sure to take a complete sample to the required depth During this process, the immediate surface is misted as necessary
- Three samples within the grid area are acquired, each placed in a metal bowl The composited samples are mixed thoroughly The sample media is misted with water/surfactant as needed
- The acquired sample is placed in a sealable container, such as a plastic bag or vial Composited samples from the identified sub-sections are combined in the same container
- The container is sealed and a pre-numbered (example 990127-MS-1-138) label is placed on the container The sample number label is placed on chain of custody papers and the container is verified to be sealed
- After each composite sample is acquired, the sampling tool is thoroughly cleaned using a mister and wipes
- The description and location is documented on a form, a sample label is placed on the form and the location is documented on a map or blueprint.
- The sample container is wet wiped and the drop cloth is carefully folded in to the center and placed in a sealable bag and the bag is sealed
- Each sample location is flagged with the sample number
- The sample location may be photographed with a sample photo identification card in the focus area documenting the sample number and date, and orienting the viewer to the location with an arrow
- All used wipes, drop cloths, and PPE will be added to the appropriate waste stream No liquid waste will be generated. The appropriate solid waste stream is determined after sample analysis If the analysis indicates less that 1% asbestos, then the related waste is considered to be non-asbestos and will be disposed of as non-routine sanitary waste If the analysis determines more that 1% asbestos, then the waste will be treated as friable asbestos containing waste. The expected one gallon plastic bag of waste will be stored in a TSCA waste holding area until analytical results are available

5 0 LAB SUBMISSION ANALYSIS AND INSTRUMENTATION

All asbestos samples shall be submitted to a laboratory recognized by the EPA National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos Appropriate sample submittal forms shall be used Currently RFETS is contracted to Reservoirs Environmental Services for asbestos analysis On-site analysis by Reservoirs is available and will be utilized for this project

The field sample number shall appear on the field sampling form the laboratory chain of custody submittal form and the container label The name of the laboratory the date the samples were sent to the lab, and all personnel handling the sample from the time of collection to the time of arrival at the laboratory shall be recorded on a chain of custody form

5 0 1 ANALYTICAL METHODOLOGY ASBESTOS

The analytical methodology for bulk asbestos samples is polarized light microscopy (PLM) capable of 400x magnification augmented with dispersion staining This method is outlined in the EPA 600/R-93/116 methods for the determination of asbestos in building materials

Bulk samples of suspect materials are examined for homogeneity, layers and preliminary fiber identification using a stereoscope at 40x magnification Layers are separated and mounted on slides Refractive index oils are applied to the slide according to a morphology match A light microscope equipped with two polarizing filters is used to observe seven specific optical characteristics of a sample at 400x magnification The presence or absence of the characteristics determines the type of asbestos, or if not asbestos, the type of fiber present in the sample The microscopist then visually estimates the percentage of asbestos or non-asbestos fibers in that layer Each layer is reported separately A layer or sample is determined to be an asbestos containing material if it contains more than one percent asbestos by this estimate The limit of detection for PLM is less than five microns

CCR 8 (Section iii B 6 ii) mandates that results from PLM analysis of samples of friable materials with asbestos percentages from trace (less than 1%) to 1% be re-assessed using point counting analysis If point counting is chosen, these results take precedence over the PLM results Point counting is a methodology that uses identical instrumentation, with the addition of a grid system on the stage The analyst is required to look at a minimum of 100 locations on eight different mounts, estimate the percentage of asbestos, and add these percentages for a statistical representation of the content

6 0 DATA ANALYSIS

Two types of data are generated during an asbestos in soils inspection, the field data and the laboratory data The field data consists of research on the site history, observation and identification of stored building materials, and measurements to determine quantities The laboratory data consists of empirical observation through instrumentation, identification and quantification of sample information

If the inspector determines that, through careful evaluation, asbestos is present at less than 1% then no further action is needed If the inspector determines that asbestos is present at 1% or greater, then further remediation may be required

6 0 1 HISTORICAL RESEARCH

Historical research allows the inspector to compile information that is used to discover and verify the existence of asbestos in building materials, hence the potential for contaminants to appear in soils where such materials were stored Maintenance and asbestos abatement records, blueprints, as-builts, specifications and emergency response documents are examples of the data used In the case of this affected area, PAC NW-1501 (see Appendix B) provided valuable information for this project Once the inspector arrives at the site, the visual inspection begins

The inspector is looking for suspect materials and damage to same This information will be used later to provide a physical assessment of the materials found and the area in which the materials were discovered

If the inspector determines that suspect materials are present, then the inspector may choose to assume that asbestos is present in the affected area and a remediation plan may be developed If the inspector declines to assume that the suspect material is asbestos, then the inspector will develop an appropriate sampling plan and acquire samples accordingly

6 0.2 LABORATORY

The laboratory data is reported, usually in tabular format, to the inspector In the asbestos report table, the inspector finds information on the fibrous and non-fibrous constituents in the sample, reported as percentages of the total material If asbestos is discovered, the table will describe the geologic type (such as chrysotile) and which layer it was discovered in Other common fibrous constituents are fiber glass, rock wool and nylon

7 0 SUMMARY

The inspector compiles the field and lab data, cross-matches information, eliminates non-asbestos containing materials from the suspect list, and generates a report on the findings The report consists of an executive summary, location and description of both asbestos and non-asbestos containing soils either sampled or assumed, estimated quantities of same, physical assessment of the friable asbestos containing materials, location of samples acquired, optional photographs of sample locations and damaged materials, and blueprints indicating sample locations and homogeneous areas that contain asbestos.

8.0 QUALITY ASSURANCE

Although the U S Environmental Protection Agency's Asbestos Hazard Emergency Response Act on asbestos regulations are not applicable outside public and private primary and secondary schools, the procedure outlined in 40 CFR 763 85, *Inspections*, 763 86, *Sampling*, 763 87 *Analysis* and 763 88, *Assessment*, has become industry accepted and is outlined in Colorado Regulation 8 in Section IV (*School Requirements*, IV C, D, E & F) In addition, OSHA 29 CFR 1926 1101 (Section k.2 i and k 5 ii) requires the building owner or manager to inspect for asbestos according to EPA 40 CFR 763 guidelines Although these regulations are specific to buildings, and no regulatory drivers exist for determining asbestos in soils outside buildings, they do provide guidance for developing an appropriate sampling plan Quality Assurance will also be followed in accordance to QAPD-001, Rev 2

Both the field and laboratory data are verified for accuracy and consistency Each sample location is verified for representative quality and the sampler verifies that the sample size or volume meets the analytical requirements, and that the sample includes prescribed depth Sample numbers are continually cross-checked to avoid redundancy or omissions Administrative and engineering controls are used in this process Administrative controls include the mandate that all inspectors and lab analysts meet all applicable regulatory training certification and licensing requirements

8 0 1 FIELD DATA

In the field, the inspector acquires quality control (or duplicate) samples at the rate of five percent with a Relative Percent Difference (RPD) of 20% allowable Sample locations are chosen randomly and a second sample is acquired at the same location This sample is sent to the same lab for analysis Should discrepancies occur, the issue is resolved by retracing the steps back to

the sample acquisition point and following the process back to the lab If the issue is still unresolved, the inspector will acquire an additional sample to be sent to a different lab

8 0 2 LAB DATA

In the Building 881 lab the analyst uses the same five percent criteria in performing quality control procedures for asbestos as outlined in the NVLAP and other programs Samples are randomly chosen and another analyst re-assesses the sample Results are compared and discrepancies are resolved All mathematical calculations are verified through peer review In addition, the Analytical Services Division (ASD) is required to validate laboratory data at the rate of 25%

8 0 3 COMPARISON/MATCHING

A last step in quality assurance involves the comparison of field and lab data The sample numbers and descriptions are checked against each other to verify that the lab observed the same material as the inspector Problems may occur due to transposition of number sequences, and this is resolved by checking the field data sheets against the chain of custody and the lab report Minor differences in the physical descriptions are allowed due to the fact that lighting in the building may be different than that in the lab Major differences in descriptions are often traced back to the number transposition issue In order to avoid this issue, inspectors will use pre-printed labels on the field data sheet, sample container, and chain of custody document

8 0 4 DATA EVALUATION

Asbestos sample data are evaluated according to asbestos content and the field sampler's determination of friability If a sample from a grid area contains more than 1% asbestos the entire area is considered to be asbestos containing If all samples from a homogeneous area contain less than one percent asbestos, the material may be considered as non-asbestos containing Decisions regarding health safety industrial hygiene and waste are determined through this evaluation

Asbestos sampling protocols require that quality control samples be acquired at the rate of five percent These sample data are checked against the data on the samples acquired at the same location A 20% variation is allowed Should that data not meet this standard, lab and field data are cross-checked for anomalies If no discrepancies are discovered, or if there is no resolution additional samples will be acquired accordingly

8 0 5 PEER REVIEW

Finally, the report itself is passed through peer review This process assures the final product will be free of technical, grammatical, and mechanical errors prior to being passed on to the client or being used as a basis for future evevts

8 0 6 RECORDS MANAGEMENT

Throughout the process of characterization, data generated within the project scope will be retained in Project History files related to historical, field and laboratory data These data are retained for the life of the project and are accessible to all project team members and any oversight personnel Historical information including blueprints, interviews, previous sampling and analysis data, interviews with building staff, along with field generated (see Appendix A) forms, logbooks and laboratory generated data will be processed according to RM-06 02, Rev 0 Records Identification, Generation and Transmittal, RM-06 04, Rev 0, Administrative Record Document Identification and Transmittal, and 1S78-ER-ARP-001, CERCLA Administrative Records Program

9.0 REFERENCES

1-77000-RM-001 *Records Management Guidance for Records Sources*

Emission Standards for Asbestos, Excerpted from Colorado Regulation No 8, *The Control of Hazardous Air Pollutants*, Part B, Emission Standards for Asbestos, November 30 1996

EPA 40 CFR 763, *Asbestos-Containing Materials in Schools*; Final Rule and Notice, October 30 1986

EPA Office of Toxic Substances, Asbestos in buildings Simplified Sampling Scheme for Friable Asbestos, October, 1985

Gilbert, R O , *Statistical Methods for Environmental Pollution Monitoring,* 1987

OSHA 29 CFR 1926 1101, *Asbestos Construction Standard,* August 10, 1994

APPENDIX A

FIGURE1 0
PROJECT FORMS

BULK SAMPLE DATA SHEET

Job#_____ **Name**_____ **Date**_____

Sampler Signature_____

General description of building/area _____

_____

_____

SAMPLE NUMBER	SAMPLE DESCRIPTION AND LOCATION	LAB

EXHIBIT 5-13 RANDOM NUMBER DIAGRAMS

Sampling Area	Sampling Locations	Sampling Area	Sampling Locations	Sampling Area	Sampling Locations
1	9 8 1 2 7 6 5 3 4	7	5 8 1 4 3 6 2 7 9	13	8 5 2 3 6 9 7 1 4
2	8 7 1 3 9 5 4 2 6	8	5 7 1 6 3 4 2 8 9	14	4 1 6 3 9 7 8 5 2
3	4 1 7 2 9 6 8 5 3	9	3 6 4 9 2 7 5 8 1	15	3 5 6 9 2 8 7 4 1
4	6 1 8 5 9 3 2 7 4	10	5 7 3 8 1 6 2 9 4	16	4 8 3 [illegible] 5 9 7 1 6
5	6 4 3 1 5 8 9 2 7	11	5 1 6 3 4 9 7 8 2	17	8 2 7 4 5 3 1 9 6
6	7 4 3 6 1 5 2 9 8	12	7 1 9 2 4 5 6 8 3	18	2 5 9 6 1 8 4 7 3

APPENDIX B

HISTORICAL DATA

PAC REFERENCE NUMBER: NW-~~176~~ 1501

NS Demos 1/26/99

IHSS Number Not Applicable

Unit Name Operable Unit 10, PU&D Yard Unit

Approx Location N751,500, E2,082,000

Date(s) of Operation or Occurrence

1974 - Present

An occurrence was reported on November 12, 1992

Description of Operation or Occurrence

On November 12, 1992 at 1600 hours it was discovered that a reportable quantity of asbestos (approximately 1 and 1/2 pounds) was released to the environment from a boiler being stored in the PU&D storage yard

Physical/Chemical Description of Constituents Released

The location of the spill is identified as being within the IHSS 170 boundary The reportable quantity (RQ) established for asbestos is more than 1 pound/pint Analytical data gathered from samples collected on May 27, 1992 show bulk asbestos concentrations at 60% of the total volume of sample analyzed Visual observations made on November 12, 1992 indicate that approximately 15 square feet of asbestos insulation was missing

Responses to Operation or Occurrence

The National Response Center (NRC) was notified immediately upon discovery of the boiler and subsequent missing asbestos Containment operations began immediately by wetting down the boiler and surrounding ground and covering the area with plastic The boiler was wrapped with plastic and taped

Fate of Constituents Released to Environment

An unknown amount of asbestos was released to the environment The area impacted by this release is submitted in accordance with the Interagency Agreement (IAG), Sections I B 3 Notification, and I B 5

Comments

None

References

As Enclosed

Analytical data from Pace Laboratories

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

EG&G Rocky Flats, Inc
P O Box 464, T452G
Golden, CO 80402

May 27, 1992
PACE Project Number D205[illegible]

Attn Mr Scott Nickerson

Client Reference 141A / J E Sanchez

PACE Sample Number			65 0046869	65 0046877	65 00468
Date Collected			05/12/92	05/12/92	05/12/92
Date Received			05/18/92	05/18/92	05/18/92
Client Sample ID			PUD 920512	PUD 920512	PUD 9205
Parameter	Units	MDL	13-01	13-02	13-03
INORGANIC ANALYSIS					
BULK ASBESTOS					
Chrysotile Asbestos	%	1	60	60	60
Amosite Asbestos	%	1	ND	ND	ND
Crocidolite Asbestos	%	1	ND	ND	ND
Tremolite/Actinolite	%	1	ND	ND	ND
Anthophyllite	%	1	ND	ND	ND
Total Asbestos	%	1	60	60	60

MDL Method Detection Limit
ND Not detected at or above the MDL

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Sampling Grid
Potential Area of Concern
(PAC NW 1501)
Property Utilization & Storage Yard
Appendix A

PU&D Yard

SAMPLE COMPOSITE AREA
Example of Subgrid Division
(#1 Composite Grid Area)
3 Composite Locations
Randomly Selected

Former Location of Asbestos Boiler
PAC NW-1501

EXPLANATION

- PU&D Yard
- 5 — Sample Composite Grid Area

Standard Map Features

- Fences and other barriers
- Paved roads
- Dirt roads
- Contours (5 foot)

Scale 1:20
1 inch represents approximately 20 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:
RMRS Rocky Mountain Remediation Services, L.L.C.

MAP ID: 99-0102

January 25,